Internal 56Kbps Faxmodem

with

VoiceMail, Speakerphone and Caller ID

Hardware's Reference Manual

VER. 1.0

UNITED STATES - FEDERAL COMMUNICATIONS COMMISSION

CONSUMER INFORMATION AND REQUIREMENTS

Part 15-Radio Interference

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation This equipment generates, uses. and can radiate radio frequency energy and, if not installed and used in accordance with the instructions. may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can he determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

Notice 2:

Shielded interface cables and AC. power cord, if any, must be used in order to comply with emission limits

Part 68 -Telephone Connection

This equipment complies with Part 68 of the FCC Rules, On the inside of this equipment is a label that contains, among other things, the FCC Registration Number and Ringer Equipment Number (REN) for this equipment. You must, upon request, provide this information to your telephone company.

The REN is useful to determine the quantity of devices you may connect to your telephone line and still have all those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices you may connect to one line should not exceed five (.5.0). To be certain of the number of devices you may connect to your line, as determined by the REN. you should contact your local telephone company to determine the maximum REN for your calling area.

If your telephone equipment cause harm to the telephone equipment, the Telephone Company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notification is not possible, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations or procedures that would affect the proper functioning of your equipment. If they do. you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this telephone equipment, please contact Technical Support of your OEM supplier. The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Statement of Fax Branding

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the huskiness or other entity. or other individual sending the message and the telephone number of the sending machine or such business. other entity, or individual.

CANADA-DEPARTMENT OF COMMUNICATIONS NOTICE

Telephone Connection

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

The user should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe systems, if present, are connected together This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number 2 assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

NOTICE:

The information in this document is subject to change in order to improve reliability, design, or function without prior notice and does not represent a commitment on the part of this company.

The information in this manual is believed to be accurate. However, we assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will we be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or the inability to use the product or documentation, even if advised of the possibility of such damages. No part of this reference manual may be reproduced or transmitted in any form or by any means without the prior written permission.
Dec, 1997

LIMITED WARRANTY

This product comes with one year hardware limited warranty. This warranty applies only to the original purchaser and is not transferable. Hardware determined by us to be defective in form or function will be repaired or at our option, replaced at no charge during the one year warranty period. This warranty does not apply if the product has been damaged by accident, such as lightning, water damage, or acts of nature, abuse, misuse, or as a result of service or modification other than by us.

This product is not intended for use in life critical situations. or as critical components in life support devices or systems.

Life support devices or systems are defined as devices which are Intended for surgical implant into the body, or for support or sustaining life, and whose failure to perform, when used in accordance with the instructions provided by the manufacturer, might result in injury to the user.
This warranty is in lien of any other warranty expressed or implied. In no event shall we be held liable for incidental or consequential damages, such as lost revenue or lost business opportunities arising from the purchase of this product.
Some states do not allow limitation of implied warranties, or exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.
This warranty applies only to this product, and is governed by the law of the state of California.

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All other product names or trademarks are property of their respective owners.

Copyright protection claimed includes all forms and matters of copyrightable material and information now allowed by statutory or judicial law or hereinafter granted, including without limitation, material generated from the software programs which are displayed on the screen such as icons, screen display looks, etc. Reproduction or disassembly of embedded computer programs or algorithms prohibited.

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INTRODUCTION

Cirrus Logic PCI Modem is based on the Cirrus Logic's CL-MD56xxT with V.34 FastPath™ platform, a proprietary high-MIPS DSP (digital signal processor). Each component is highly integrated using Cirrus Logic's state-of-art process technology. The result is a platform with low power requirements and high performance. The FastPath platform's scalability allows the graceful addition of computer telephony features such as DSVD, speakerphone, and telephone emulation. The CL-MD56xxT exceeds Microsoft® PC 97 specifications for Windows®, and it is TAPI-and PCI 2.1 compliant.

Cirrus Logic PCI Modem supports all requirements for PC-based communications. With its robust host-based controller software and powerful DSP, the modem support all industry-standard AT commands for data, IS-101 voice, and Class 1 fax. **Cirrus Logic PCI Modem** offers data receive speeds at up to 56 kbps using US Robotics x2 Technology. Current restrictions by the Federal Communication Commission limit actual data receive speeds to 53,333 kbps.

Cirrus Logic PCI Modem is a solid base for future innovation. The DSP delivers the bandwidth to handle multiple tasks simultaneously and support specialized functions. All voice features TAPI standards, and all voice commands comply with IS-101 command standards.

Cirrus Logic PCI Modem is expected to support any eventual ITU 56-kbps standard.

This hardware reference manual contains all the information you need to install your modem. You should still retain this manual for knowledge basic and AT commands reference, even though you may never need to use the AT commands that are documented here.

FEATURES

- **Complete PC telephony solution**
  - Up to 56-kbps data rates
  - host-based controller
  - PCI 2.1-compliant
  - Exceeds Microsoft® PC 97 requirements
  - Microsoft® Windows® TAPI-compliant
  - Echo-cancelled digital speakerphone
- **Data modulation**
  - U.S. Robotics® x2™ Technology
  - ITU-T V.34 (33,600 to 2400 bps) symmetric and asymmetric operation
  - ITU-T V.32 bis, V.23, V.22bis, V.21
  - Bell® 212A and 103
- **Fax modulation**
  - ITU-T V.17, V.29 to 14,400 bps
- **Voice telephony**
  - Echo-cancelled digital speakerphone
  - IS-101 voice command
  - Telephone emulation for headset applications
  - ITU-V.80 for videophone
- **Voice coder**
  - Voice compression: ADPCM, linear, and CL1
  - 4800, 7200, 8000, 9600, and 11025 samples per second
- **Data link layer protocol**
  - Error correction: ITU V.42 and MNP® 2-4
  - Data compression: ITU V.42bis and MNP® 5
- **DTE integrated interface alternatives**

- PCI Rev.2.1 - compliant

Host-based controller

- Fax Class 1 commands
- Fax Group 3 mode
- Voice IS-101 commands

Minimal-component design

- Direct connection to PCI bus
- Single crystal
- Passive hybrid

Low power requirements

- Single +5-V power source; 3.3-V DSP
- Automatic sleep and wake-up modes

Plug and Play

- Jumperless configuration

SPECIFICATIONS

Chipset:

Cirrus Logic CL-MD5620DT
Cirrus Logic CL-MD1724T

COMMUNICATION MODES AND DATA RATES

DATA APPLICATION

Mode	Data Rates	Modulation	Baud Rates	Carrier Frequency
x2™ Technology (Receive only)	**57,333** -,,,,,,,, **-33,333**	**x2™**	**8000**	**N/A**
x2™	**31,200**			

Technology (Transmit only)	-,,,,,,,, -4800	TCM	3200	1920
V.34	33,600 -,,,,,,,, -2400	TCM	Variable	Variable
V.32 bis	14,400 -,,, -4800	TCM	2400	1800
V.32	9600 9600 4800	TCM QAM QAM	2400	1800
V.22 bis	2400	QAM	600	1200/2400
V.22	1200	DPSK	600	1200/2400
V.21	300	FSK	300	1180S/1850S
Bell 212A	1200	DPSK	600	1200/2400
Bell 103	300	FSK	300	1070S/2025S

FAX APPLICATION

Mode	Data Rates	Modulation	Baud Rates	Carrier Frequency
	14,400	TCM	2400	1800
V.17	12,000	TCM	2400	1800
	9600	TCM	2400	1800
	7200	TCM	2400	1800
	9600	QAM	2400	1700
V.29	7200	QAM	2400	1700
	4800	QAM	2400	1700
V.27 ter	4800	DPSK	1600	1800
	2400	DPSK	1200	1800

V.21	**300**	**FSK**	**300**	**1650M/1850S**

x2 Technology is a proprietary technology developed by U.S.Robotics and licensed by Cirrus Logic. The x2 Technology data receive rates of up to 56,000 bps can be achieved only in connections with equipment-compatible ISPs (Internet Service Providers).
FCC regulations do not allows the 57333, 56000, and 54666 bps rates to be supported.

PHYSICAL/ELECTRICAL/ENVIRONMENTAL

Dimensions:	3" x 4.75"
	8 cm x 12 cm
ROM:	FLASHPROM
Cables:	15' phone cord
Connectors:	1 RJ11 jack, for telephone and PSTN line connections
Speaker Interface:	Maximum load 8 **Ω**
Humidity:	20-90% (non-condensing)
Temperature:	0° to 70° C (32° to 158° F)
Storage Temp.	-65° to 150° C
Transmit Level:	-6 dBm ±1 dB dialup; Programmable.
Receive Level:	-9 to -43 dBm. DCD is deactivated at -48dBm or below.

SYSTEM REQUIREMENT

- PC system with a free PCI slot
- A CD-ROM Drive to load software
- A Hard Disk Drive with 5 MB free space
- A Microphone or speaker, headset (Optional)
- A free COM port address: 1, 2, 3, 4
- A free IRQ for the COM port: 3, 4, 5, 7, 10, 11, or 12

MODES OF OPERATION

The CL-MD5620DT chipset provides the complete modem functions for the following modes: Group 3 fax, data, voice, V.42/MNP 2-4, and V.42 bis/MNP 5 (Microcom Networking Protocol Class 5). Each mode has its own unique AT command set. Additionally, the modem provides special modes of operation for VoiceView, and power management.

DATA MODE

In the data mode, the 56K modem operate at up to 33,600 bps (send) and up to 56,000 bps (receive). It implements all data rates and modulation schemes for ITU-T standards V.34, V.32bis, V.32, V.22bis, V.22, V.21, Bell 212A, and Bell 103. The CL-MD5620DT implements a standard (TIES) Data mode AT command set. This is compatible with any communication application software that supports the Hayes® AT command set.

V.42/MNP® 2-4 AND V.42 BIS/MNP®5 MODES

The Cirrus Logic PCI Modem supports error correction(V.42/MNP 2-4) and data compression (V.42 bis/MNP 5). Error correction ensures error-free data transfer. Data compression substantially increases the modem data throughput over the basic data rate. Depending on the data stream, MNP 5 may provide up to 2:1 compression. Alternately, ITU-T V.42 bis can provide up to 4:1 compression.

FAX MODE

In Fax mode, the Cirrus Logic Modem operate at up to 14,400 bps (transmit and receive) and implement all the data rates and modulation schemes for ITU-T standards V.17, V.29, V.27ter, and V.21 channel 2. The CL-MD5620DT chipset implements a standard Fax mode AT command set compatible with any communication application software that supports EIA/TIA-578 Fax Class 1 standards.

VOICE MODE

The modem supports Telephone-Emulation mode, IS-101 voice commands, and record and playback message capabilities. Telephone-emulation mode allows a handset/microphone-speaker and modem to be used as a complete telephone. In Telephone emulation mode, the received data from SAFE (CL-MD1724T) the microphone interface is looped back to the SAFE analog transmit pins. In voice mode, the message record and playback abilities are accessed by the extended AT command set.

VIDEOCONFERENCING (V.80) SUPPORT

The CL-MD5620DT supports the ITU-V.80 recommendation. This feature ensures compatibility with host-based H.324 videoconferencing

application software. The modem supports both transparent and framed submodes of the V.80 synchronous access mode.

POWER MANAGEMENT MODES

The CL-MD5620DT chipset provides both sleep and stop modes to reduce power consumption when the modem in inactive. Stop mode turns off all modem power except for the circuitry needed to maintain the host interface signals at the appropriate high-impedance state.

Power-on mode consists of an Operational mode and a sleep (or power-down) mode. In Operational mode, the modem chipset is fully powered and is either communicating with the host and/or another modem or is performing internal processing.

In Sleep mode, power is turned off to most of the internal circuitry of the DSP and SAFE. Sleep mode is controlled by S-register S33. When enabled, the modem enters Sleep or Power-down mode whenever the modem has been inactive for a user-programmable time delay.

The modem is considered to be in an inactive state when:

1. No internal processing is being performed;
2. No activity occurs between the host and the modem within a specific timeperiod;
3. The modem is on-hook.

   The mode exits sleep mode whenever the host writes the modem or when a ring signal is detected. The modem does not wake up after the host reads the UART registers.

TRANSMIT TONE LEVELS

The modem generates DTFM, answer, call and guard tones.

CALLER ID

Caller ID is a service that allows the user to see the caller's telephone number. Caller ID also provides information on call date and time. This service is not available everywhere due to Central Office telephone equipment limitations and legal prohibition in some locations.

For more information on how to use this feature, please refer to the communication software user's guide.

MODEM INTERFACE

PLUG AND PLAY HOST INTERFACE

The 56K Controllerless modem supports hardware interface for the host, flash memory, expansion bus, NVRAM, DAA, speaker, microphone, and general-purpose I/O functions.

DSP BUS INTERFACE

A 32 x 16 bit, 12ns SRAM is on board for all CL5620DT-based modems. The SRAM is used to store DSP code for the x2 mode.

NVRAM INTERFACE

A serial interface is provided for the 2K (x8 configuration) non-volatile RAM (NVRAM). The NVRAM can be used for storing modem configurations. Plug-and-Play designs can be NVRAM to store the board's serial number information.

DAA INTERFACE

A DAA (Data Access Arrangement) is the interface between the modem chipset and telephone network. the DAA interface controls the telephone line off-hook relays, detects ring signals, and transmits and receives analog signals.

SPEAKER INTERFACE

The SAFE device internally implements both the volume control and amplifier necessary to drive an external speaker. The output of internal amplifier can be connected directly to a speaker or to the input of the host speaker amplifier. The internal amplifier is capable of driving a maximum load of 8 **Ω**. The speaker volume is controlled by the ATLn command.

MICROPHONE INTERFACE

The modem provides a microphone interface that connects a microphone to the modem. This microphone input can then be used for local voice record mode or for Telephone-Emulation mode.

CHECK LIST

In addition to this Hardware's Reference Manual, your package includes the following items:

- 56 kbps Voice/Fax/Data Internal Modem
- The Communication Software and Documentation CDs
- RJ11 Phone Cord

TECHNICAL SUPPORT

If you encounter a problem with your modem, you may consult the "Trouble Shooting" section in later chapter.

If your modem is purchased from OEM supplier, or as a part of PC from a system integrator, please call their Technical Support first.

INSTALLATION

GETTING STARTED

This section will walk you through of your modem's installation. Before you getting started, make sure that you do have the following items:

The 56 kbps internal Voice/Data/Fax Modem

Communication Software and Manual

RJ11 (Standard) Phone Cord

Telephone Line Jack

Appropriated hardware tools

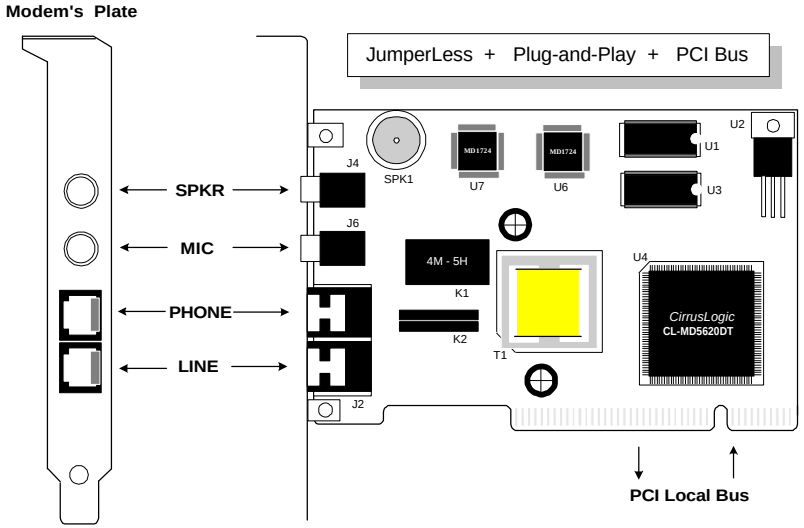
COM PORT AND IRQ

This modem is Plug-and Play device and no jumper settings needed on board. However, you may organize the PCI configuration on CMOS setup utility to explicit the IRQ sequence for PCI slots, or make available IRQ for its purpose. Most communication software prefer standard COM port and IRQ, e.g. COM1, IRQ4 or COM2, IRQ3. Your system may have unused

Serial (UART) port occupies one of this port address and IRQ. It is recommended to disable it and let your internal modem use the COM port address and IRQ. Refer to your main board or I/O card manual on how to disable the port in your system.

HARDWARD DESCRIPTION

BOARD LAYOUT



U1 - Memory	U7 – MD1724T	T1 - Transformer
U3 - Memory	U2 - V.Regulator	J2 - Phone/Line
U4 - MD5620DT	K1- Relay (optional)	J4 - SPKR port
U6 - MD1724T	K2 – Relay	J6 - MIC port

Note: Cirrus Logic PCI Modem may have different PCB layout with differ Revisions.

HARDWARE INSTALLATION STEPS

STEP 1: INSTALLING THE MODEM

TURN YOUR COMPUTER'S POWER OFF.

Turn off the power to your PC and any attached peripheral devices such as Printers, Scanner and Monitor.

REMOVE THE COVER FROM YOUR PC.

Remove the computer's cover, retain the screws if any.

REMOVE THE SILVER BRACKET ON THE BACK OF THE PC.

Find an empty PCI slot inside your computer. Remove the silver bracket behind the slot where you want to install the modem. Save the screw.

PLACE THE MODEM INTO AN AVAILABLE PCI SLOT.

Before you remove the modem from its static resistant bag, you must discharge any static electricity on your body by touching a grounded metal surface. When handling this modem, hold it by its edges, and avoid touching its circuitry.

REPLACE THE COVER ON YOUR PC.

Slide the cover back on your PC, and secure it with the screws. Reconnect your power cord, and all cables.

STEP 2: CONNECTING EXTERNAL DEVICES

CONNECT THE MODEM WITH TELEPHONE CORD.

Plug one end of the included telephone cord into the LINE jack on the modem and the other end into wall telephone-outlet.

CONNECT THE MICROPHONE TO MIC PORT.

If you have a microphone, you can plug the microphone jack into the MIC port on your modem.

CONNECT THE SOUND OUTPUT DEVICE.

To use the modem's speakerphone feature, you can attach standard external multimedia speakers to the modem, or make a connection between the modem and a sound card. Both methods allow you to record personalized greeting messages, and play your received voice mail messages through speaker.

SPEAKERS

You can also plug speaker jack to the SPKR port on your modem if you do not have sound card, or your sound card doesn't supported by the communication software.

PLAY VOICE MAIL WITH SOUND CARD

If you already have a sound card installed in your computer, you can use your sound card to record personalized greeting messages or play voice mail messages if your communication software support your sound card.

MODEM SETUP WITH WINDOWS® 95

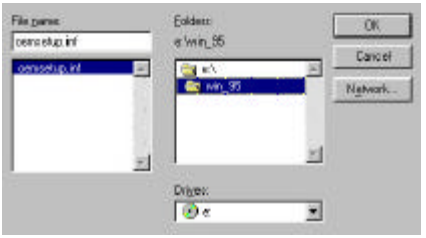
INSTALL .INF FILE TO THE WINDOWS® 95

Cirrus Logic PCI Modem is a PCI PnP device which automatically detect by Windows'95, and you can start driver's installation from the there.

PCI Card
Select which driver you want to install for your new hardware
Driver from disk provided by hardware manufacturer
Do not install a driver (Windows will not prompt you again)
Select from a list of alternate drivers
OK
Cancel
Help

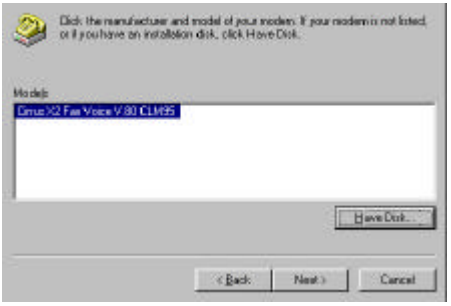
Select "***Driver from disk provided by hardware manufacturer***" then click on ***OK*** button.

A new screen pops up ask for installation disk from hardware manufacturer. Now, insert the driver CD into your CD ROM drive. (X is the letter for your CD-ROM, typically D or E. etc.,)



You may navigate or " Browse" on CD Drive X:\Driver\56K\, appropriate .INF file appears on screen, then click on <***OK***>.

Press <***OK***> button again; the process of installation will continue.


Click the manufacturer and model of your modem. If your modem is not listed, or if you have an installation disk, click Have Disk.
Models
Cirrus X2 Fax Voice V.90 CLM95
Have Disk...
< Back
Next >
Cancel

Windows'95 recognizes the modem and displayed it on your screen. In this screen, press the <***Next***> button to configure the COMM. Port for your modem (e.g. COM4, etc.), then click on <***Next***>again to the Finish Installation screen.

VERIFY THE MODEM INSTALLATION

From Windows'95 environment, fewer places you may to verify the modem's Installation, and also you can modify it's configuration, make sure this modem has been installed properly without any conflict errors.

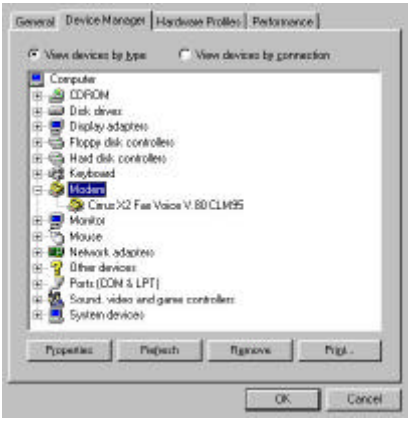
After modem complete installed, a new icon "***CLM Configuration***" that placed to "***Control Panel***".

You can double-click on it, the "***CLM setting***" pops up, and there are three tab options you should verify your modem's configuration or make changes if necessary for any determination.

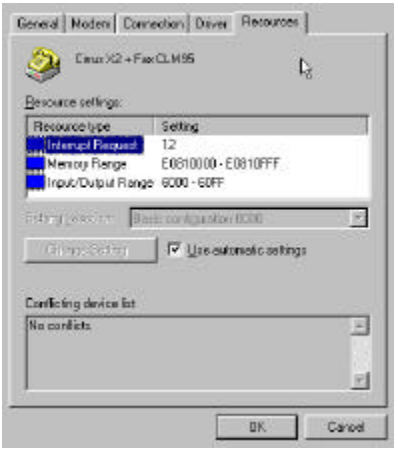
Preferences
COM Port
Uninstall
CLM Preferences
Modem Front Panel
Automatically start modem front panel applet
Causes the modem front panel applet to start as a tray icon automatically when Windows loads.
Modem Drivers
Enable DOS Box support
Enables modem support for DOS-based applications and DOS-based games in Windows 95.
Enable IRQ Sharing
Allows modem to share an IRQ with other devices in the system (network card, video card, etc.).
OK
Cancel

You may need check-over the Modem's IRQ setting with the system " ***Properties***".

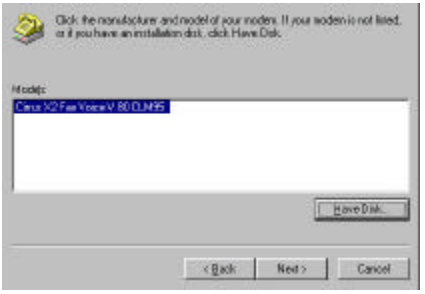
Open "***system***" icon in "***Control panel***", switch tab bar on "***Device manager***", then click on the "***Modem***" item, and you should see the device with no yellow-exclamation (!) or red-across (X) marks.



Highlight ***Cirrus X2 FaxVoiceV8.0 CLM95*** and click on "***Properties***" button. Then, Resource tab screen with "***No conflicts***" on Device settings.



To scene modem environment and details from ***Control panel*** , you may click on “Modem” icon, open ***Diagnostics*** tab screen.



Highlight modem with COM port, and click on “ ***More Info***…” button. Then, ATI command prompts all information on firmware code and hardware’s version. You may write down this specification for technical assistance when you needed.

Default settings from manufacturer is COMM port = 4.

COMMUNICATION SOFTAWARE

Communication software allows you to change settings and issue commands to your modem.

We have bundled third party communication software with 56 kbps Data/Fax/Voice internal modem and Documentation CD. Please refer to the README.TXT files for updated information which is not included in this hardware reference's manual.

Once the modem hardware installed and configured properly, you may use the modem with most PC communication software for Windows®95.

KNOWLEDGE BASIC

This section will address some basic terminology associated with your modem and with your communications software.

MODEM

Modem is a compound word of Modulator and DEModulator. It is used for computer communication. Modem translates computer data to analog signal (modulation) that can travels through the telephone network and reaches the

other modem. The remote modem translates the analog signal received back to data (demodulation) and sends to the receiving end computer.

FAX MODEM

Normal modem can be designed to have the fax transmitting (or and) receiving function(s).

VOICE MODEM

Modem with digitized voice capability can digitize the incoming voice message and the computer can store it as a file. The voicemodem can also playback a recorded digital voice message either locally or to the line as an announcement.

DTE / DCE

DTE stands for Data Terminal Equipment and DCE stands for Data Communication Equipment. The Computer or terminal is the DTE and the modem is the DCE.

DSP

Digital Signal Processor. It performs all digital signal processing functions for the chipset, such as modulation schemes and modem handshakes.

UART

UART (Universal Asynchronous Receiver Transmitter) is the device used in DTE or DCE for asynchronous data receiving and transmitting. The normal UART device used in PC is NS16450. For high-speed serial data receiving (38400 bps and up), the PC may not be fast enough and data may get lost. In this case, a UART with data buffer is needed such as 16C550A.

NVRAM

NVRAM(Non-Volatile RAM) is a device to store the DCE configuration. Upon powering-up, the modem defaults to the configuration specified in the NVRAM or to the factory default (if the NVRAM is not installed). DCE configuration can be changed and stored by DTE in the NVRAM by first setting up the current configuration and then sending an AT command &

Wn. The active profile will be lost if reset commands are issued or the modem is powered down. For examples:

ATZ	Resets and then configures the modem to NVRAM user profile 0.
AT&F S0=1 &W1 &Y1	&F configures the modem to factory default &S0=1 configure the modem to answer after 1ring &W1 saves the active configuration to profile 1 &Y1 configures the modem to use NVRAM user profile 1 as the power-up defaults.

AT COMMAND SET AND S-REGISTER

The modem (DCE) operates in one of two states: command or online. In each state, both data and commands (including DCE response) are transferred through the UART. In command state, the host (DTE) communicates to the modem through AT (stands for attention) commands and S-registers. AT command set is the industry standard used to control the modem in command state. S-registers are internal modem registers that DTE can access. AT command set is extended by each modem manufacture for the control of more modem functions and capabilities.

INIT STRINGS

An Initialization string is a series of specific commands that prepares a modem to operate with communications software.

XMODEM, YMODEM, ZMODEM

These are file transfer protocols used by the host (e.g. communication program in the PC). It does error checking and ensures data integrity of the file transfer. There are some other protocols. Zmodem is the most preferred protocol to use.

DATA RATE

The modem recognizes AT commands from the DTE at any valid data rate from 300 bps to 115,200 bps; however, the DTE should use the data rate specified for each mode:

Mode	data Rate (bps)	Affected Data
Data	300-33,600	Modem-to-modem data rates
	300-115,200	DTE-to-modem data rates
Fax	19,200	AT commends and data transfers
Voice	19,200-115,200	AT commands, playback and record modes (varies according to compression type)

MNP

Microcom Network Protocol is a data communication protocol that allows error-free interactive communications with a variety of computers or terminals over ordinary voice-grade telephone lines.

LAPM

Link Access Procedure for Modems. An HDLC error correction protocol for use with error-correcting modems. Part of the ITU-T V.42 protocol.

XON/XOFF

A handshaking, flow control mechanism that communicates that the device is ready to accept more data. The flow control is embedded into the data stream by using special characters; hence transmit on (XON), transmit off (XOFF) often referred to as software flow control.

CTS/RTS

CTS stands for Clear To Send. RTS stands for Request To Send, a handshake line in which the computer tells the modem it can accept new data.

DCD

Data Carrier Detect

DSR

Data Set Ready. Supplied by the modem to indicate it has power and is ready to accept commands.

DTR

Data Terminal Ready. Signal generated by the computer to indicate it can accept data from the modem.

DUPLEX

A communication system which is capable of communicating in both directions can be half duplex or full duplex. Half duplex allows communication in both directions, but only one direction at a time, while full duplex allows data to be transmitted in two directions simultaneously.

OFF-HOOK

Picking up a telephone receiver. You take the modem off hook to dial or answer and it remains off hook while you are connected.

ON-HOOK

Hangs up a telephone receiver. You are not connected to Telephone Central Office when the modem is on hook.

DTMF

Dual-Tone-Multi-Frequency. The use of two simultaneous audio band tones for dialing.

CCITT

Acronym for the International Telegraph and Telephone Consultative Committee. An international organization that decides upon recommended communication protocol standards. Also see ITU-T.

ITU-T

International Telecommunication Union-Telecom. Formerly CCITT.

TECHNICAL REFERENCES

Make sure the modem card is firmly and evenly inserted in the expansion slot. Check up and make sure that the phone and line cables are connected to the correct jacks on the modem's plate bracket.

Tips for high-speed connections using a V.34 or faster modem.

Very few people can reach a consistent 33,600 or 56K(x2 modem) bps connection. Speeds of 28,800 bps or faster, require perfect, almost ISDN quality, and line conditions along the entire length of the connection. However, V.34 and 33.6k modems are capable of pushing the limits of analog phone lines, commonly offering connect speeds of 21600,24000, and even 26400 bps or higher.

Variations in line quality are typically the cause of low connection rate. At one point or another, everyone will experience " a bad line" connection, and have to hang up and call again. However, if you find that you never or rarely connect at rates above 19200 bps, you will need to investigate the line quality of your connections.

If you encounter the same low connection rate, the problem may be resulting from impairments along the lines running to the local Telephone Company or within your home or office. Your telephone company or a private consultant may be able to help.

Modem does not respond to AT commands.

Either the COM port settings mis-match within hardware and software or the wrong type of your modem configuration.

Verify the hardware jumper settings if there is any for modem IRQs, COM port with reference manual from product manufacturer, or tech-support from your dealer.

Verify the PnP modem setup with Windows'95.

Check and update the modem's configuration through the Windows'95 Modem Properties windows.

1. To view this information, you need to enter the "SYSTEM" information in the Windows'95 Control Panel.

2. Double-click the Control Panel folder.
3. Next double-click the System icon. A System Properties screen will be display.
4. Choose the Device Manager menu. There are now two different areas where you can look for information about the modem setup and the computer setup.
5. First double-click the Modem icon. All modems that have added to your system will appear.
6. Find and double-click your modem's name. If it is not present, the installation did not work at all. If it appears then the Device status area display the message which shows this device is working properly. Otherwise, you may get an error message.
7. Click on the Resource Menu. This window shows the modem's configuration. The input/output range indicates the COM port address. Below this is the interrupt Request (IRQ) number. At the bottom of the screen is a "Conflicting device list". If no device conflict, then a "No conflicts" message should appear.

Additionally, for PCI plug-and-play device, the modem's COM port address and IRQ can be changed from the Windows' 95 Modem Properties screen.

Verify the modem with regedit.exe and HyperTerminal.

Verify Installation with REGEDIT.EXE Use Windows 95's REGEDIT.EXE program to access the PCI plug-and-play code.

1) From the Windows 95 Start Menu, choose Run. Type "REGEDIT". The Run function generates the Registry window on your screen.
2) Double-click on the HKEY_LOCAL_MACHINE folder.
3) Double-click on the Enum folder.
4) Double-click on the PCIPNP folder, which shows one or more modem folders.

The subdirectory names are base on the PCI PNP Unimodem ID. The name contains a three-character manufacturer ID and a four-digit product ID. For

example, “CIR1000” refers to Cirrus Logic product 1000, which stands for the CL-MD1414US plug-and-play product.

5) Double-click the subdirectory containing your modem.
6) Double-click on the ‘0’ directory. Information about your modem should appear in the right window of the Registry Editor screen.

Test your modem with HyperTerminal.

The fastest way to verify whether the modem was added properly is to use the HyperTerminal program to send an AT command to the modem. Alternatively, you can use the software’s autodial feature. Installation was successful if you get an “***OK***” back from the modem or if the modem dials

use the auto-dial feature. If HyperTerminal returns an error message, then the installation either did not work properly or a COM port or IRQ conflict exists.

HyperTerminal is located in the Windows 95 program Accessories menu. After loading HyperTerminal, set the modem type to your modem. If your modem type is not displayed, then the Unimodem ID installation failed. Correctly entering the modem type, you also need to enter a telephone number (even though you may not use the dial feature). Then, press the “***OK***” button, the HyperTerminal will display Dial screen.

To make sure the installation was successful, type **AT**. You should see an **OK** message. If HyperTerminal displays an error message, then the system is not configured properly, and you should check the Windows 95 modem properties.

Setup Cirrus Logic PCI Modem.

If your modem is not detected by Windows’95 PnP function, then you simply need to add this modem from the Windows’95 modem property:

1) In the ***Control Panel***, double-click on the “***Modems***” icon.
2) Press the “***Add***” button in the Modem Properties screen.

3) Press the" ***Next*** " button in the Install New Modem screen.

Windows 95 then generates a Unimodem ID for your modem and checks whether is already supported by Window's .INF files. If supported, then Windows 95 display the detected modem's name in the Verify Modem screen.

Alternatively, you may need to install a new .INF file for your modem. If the verify Modem windows shows that **Standard Modem** was found, then Windows 95 detected the modem but either did not recognize the Unimodem ID and/or the correct .INF file was not previously installed.

To install a new .INF file for modem:

1) Press the "***Change***" button.
2) Press the "***Have Disk***" button.
3) Place the floppy disk containing the .INF file into your floppy drive. You should now see an Install from Disk window on your screen.
4) Then press the " ***OK***" button. If the new .INF file supports your Unimodem ID, then Windows 95 may autodetect your modem or list available modems from your disks.
5) Select the appropriate modes and press the "***OK***" button.
6) Press the "***Next***" button in the Verify Modem window.
7) Then, press the "***Finish***" button in the install New Modem window.

Another way to install a new .INF file is to copy your manufacturer .INF file to the "\Window\INF" directory before trying to add a new modem. In this case, Windows 95 may auto-detect your modem without your having to manually select the modem.

PnP setup doesn't work

The problem most likely is you do not have the right .INF file for your modem. Additionally, you may have an IRQ conflict problem. If you have a plug-and-play modem, Windows 95 will not let you easily share IRQs with other devices. For example, if the serial ports COM1 and Com2 use IRQ4

and IRQ3, then Windows 95 will not let you use IRQ3 or IRQ4 for your new modem.

Unfortunately, you may manually delete the old .INF file from \Windows\INF directory . Then replace new OEM*.INF (provide by Modem manufacturer) to that same directory.

FREQUENTLY ENCOUNTERED PROBLEMS:

Problem: ***Modem would not dial***

Solution : Check your phone line and cable connections. Make sure that the line from the wall is connected to the LINE jack of the modem.
Issue command: ATS6=6

Problem: ***No dial tone message***

Solution : Make sure no other phone extension has been picked up on the same line.
Make sure that the telephone line, coming from the wall is connected to the LINE jack and NOT to the PHONE jack on your modem.
Check to make sure you are using a standard analog telephone line and not a digital line.

Problem: ***Modem does not dial correctly***

Solution A: Your phone system may require that you obtain an outside line before dialing. In this case, place the numeric prefix for the outside line (usually the number 9) before the phone number in your dialing string.
9 555 3333 **To get out of the office**

NOTE: Place a comma immediately after the number 9 in the dialing string to create a 2 second delay at that point in the dialing. This prevents the modem from dialing the phone number before the phone system has had time to connect to an outside line.
9, 555 3333 **To get a pause**

Solution B: You may be trying to dial into another area code; you must first
dial a 1 before the phone number in your dialing string.
1 555 555 3333 **To get into another area code**

The other end could be busy or not answering.
Make sure the number you dialed is correct.
Test the number by dialing it on your telephone - not through your modem.
If you are using the modem internationally, your modem may not recognize the dial tone in the local country. Try the command ATX3DT and the telephone number.

Problem: ***Error message***
Solution : Make sure you selected the correct modem in your communications software.
If you are typing from the command line in terminal mode, make sure you typed correctly.
Make sure you are issuing the correct AT command.
Note: Not all modems support the same AT Command set. Check the AT Command set in this manual to ensure that you are using a valid AT Command.

Problem: ***Modem communication error or modem not found***
Solution : Make sure you have selected the correct COM Port in your communications software setup.
Check all the cable connections and make sure they are secure.
In fax software, make sure you have selected the correct fax class.
The Port setting in the Control Panel in Windows may not be set properly;

Problem: ***Modem would not connect.***
Solution : If you have no trouble communicating with any modem except
on one particular line, the problem may be with the modem on the other end of that line.

Problem: ***Modem would not fax***

Solution : Make sure you have selected Class 1 fax class.
Make sure that you do not have another communications program open.
Be sure you selected the Fax printer in your word processing program.

Problem: ***Fax not found***

Solution : Re-install or re-setup Fax software with the modem installed.
The Port setting in the Control Panel in Windows may not be set properly;
You may have connected the phone line, coming from the wall, to the Phone jack on the back of the modem. The phone line, coming from the wall, must be connected to the Line jack.

Problem: ***Modem does not respond to AT Commands***

Solution : Make sure the COM port settings in the software match the hardware configuration.
Make sure the board is seated properly (pushed all the way into the slot).

POSSIBLE INSTALLATION PROBLEMS

Problem: ***IRQ Conflict***

One of the biggest installation problems occurs when more than one modem or serial card uses the same COM ports and IRQs. Additionally, other devices like the mouse or sound card also may use conflicting IRQs.

Solution :

If you have a COM port conflict, then you can try a different COM port. Many computer systems come with either one serial port and a modem or two serial ports that use COM port 1 and COM port 2; therefore, it is best to try COM port 3 and COM port 4.

If you believe an IRQ conflict may exist, go into the Windows 95 Computer Properties screen and double click the Systems icon at the top of the screen. Windows 95 then shows the IRQs being used by the system. Scroll down the screen and find an IRQ not being used, then try changing the board IRQ to this number. If the board does not support this IRQ, then you can change the IRQ number on another device and use this IRQ for your modem. Alternately, you can free up an IRQ by removing an existing board from the computer and removing its name from the Computer Properties screen.

CAUTION: Removing the device name from the Computer ***Properties*** screen may cause problems later when using the removed board.

.INF FILE NOT LOADED PROPERLY

Determining Whether the .INF was Loaded

Go back to the Modem icon in the Windows 95 Control Panel. After double-clicking the icon, check whether your modem's name is displayed in the Modems Properties screen. If so, then the .INF file is loaded properly. If your modem is not shown, then one of the following problems could have occurred: a wrong .INF file, Windows 95 did not recognize your modem, the Cancel button was mistakenly pressed during installation, or the modem type name was removed previously.

What To Do if the .INF Was Not Loaded

Try adding the board again. If that still does not work, try removing the board and adding a different modem. If this works, then there may be a hardware problem or a COM port conflict problem.

WINDOWS 95 IRQ CONFLICTS

Determining If There Is A Conflict

Even if the hardware works perfectly and the .INF file is installed properly, Windows 95 may still have problems using the board. Part of the problem is that even though DOS and Windows 3.1 allow you to share IRQs between COM ports (for example, COM1 and COM3 typically use IRQ4; COM2 and COM4, IRQ3),

Windows 95 does not appropriately support devices sharing IRQs. For plug-and-play devices, this may become a major problem. For non-plug-and-play boards, Windows 95 may allow you to share IRQs.

What To Do If There Is A Windows 95 IRQ Conflict

On the Computer Properties screen, manually select the modem's IRQ. This may or may not work. Alternately, free an IRQ line by deleting or removing existing devices or boards, then manually select the modem's IRQ from the Computer Properties screen.

USING THE WINDOWS 95 COMPUTER PROPERTIES SCREEN

The computer properties screen displays the hardware and software drivers used by the computer. Use the following directions to access the Computer Properties screen:

THE SYSTEMS PROPERTIES SCREEN

Press the Windows 95 Start icon, then press the Settings icon. Choose the Control Panel.

Double-click the System icon on the Control Panel. The System Properties screen appears.

Press the Device Manager tab in the System icon. A screen displays the devices installed on your computer.

Double click the Modem icon. This screen displays the installed modems.

Find your modem and double-click on that selection. If your modem does not appear, then either the modem was not added through the Modems Icon in the Control Panel or the modem's installation process failed.

After double-clicking your modem type, a new screen displays information about your modem. This screen informs you whether the device is working properly and if there is a COM port or device conflict. After you're finished viewing this window, press the OK button to return to the System Properties menu.

To remove or eliminate a modem, select the modem in the System Properties menu and press the Remove button. Alternately, access the Modems icon from the Control Panel, select the modem name, and press the Remove button.

COMPUTER PROPERTIES SCREEN

From the System Properties window, double-click the "***Computer"*** icon. This opens up the Computer Properties screen. This screen provides information on which IRQs, I/O address, Memory Address and DMA channels are used by the computer.

To see if any IRQs are available, select the Interrupt Request (IRQ) circle at the top of the Computer Properties screen (the default selection when first entering this window). Next, scroll down to see which IRQ numbers are used. If an IRQ number is not shown, then that IRQ is not being used by the system and can be used by your modem (if your modem supports that IRQ number).

To determine which COM ports address are available, select the Input/ Output (I/O) circle at the top of the Computer Properties screen. Scroll down the screen to see what COM ports are being used. The COM port addresses are: COM1 03F8-03FF, COM2 02F8-02FF, COM3 03E8-03EF, and COM4 02E8-02EF. If the address for any of the COM ports is not shown, then that COM port is available.

AT COMMANDS

BASIC DATA MODE AT COMMANDS

- An AT command string begins with an AT prefix and ends with the content of S-register S3 (typically a carriage return <ENTER>). The A/ and escape sequences are the only exceptions. AT stands for attention and prompts the modem to receive a command line from DTE.

- AT command strings can contain multiple commands in the same string. These commands are placed after the AT prefix and before the <ENTER>. Spaces may be used to separate commands within the string, but no punctuation is needed except for fax and voice commands. In a multiple-command line, fax and voice AT commands must be separated from following command by a semicolon (;).

- The maximum length of an AT command string is 40 characters. The AT prefix and any spaces are not counted.

- The AT prefix and commands may be entered in either upper or lower case.
- For commands that contain numeric options you may omit the numeric value and the modem will assume that the number 0 was entered.

Table 1. Basic Data Modem AT Commands

Command		Description
A/		Repeat the last AT command string issued. An "AT" prefix is not used. Do not terminate this command with <ENTER>.
A		Answer. Go off-hook and enter the answer mode. After 3 seconds the modem will initiate an answer tone.
Bn		ITU-T or Bell® (Default=1)
	B0	Use ITU-T V.22 at 1200 bps, and ITU-T V.21at 300 bps
	B1	Use Bell® 212A at 1200 bps, Bell® 1035 at 300 bps.
	B2	Use ITU-T V.23 only. The originating modem transits at 75 bps (and receives at 1200 bps); the answering modem receives at 75 bps (and transmits at 1200 bps)
	B3	Selects ITU-T V.23 only. The originating modem transmits at 1200 bps (and receives at 75 bps); the answering modem receives at 1200 bps (and transmits at 75 bps)

Command		Description
Cn		Carrier control option (Default=1)
	C0	Transmit carrier always off
	C1	Normal transit carrier
D		Dial command
En		Command Echo (Default=l)
	E0	Disables command echo from the modem.
	E1	Enables command echo from the modem.
Fn		Online echo (Default=1)
	F0	Enables online echo
	F1	Disables online echo
Hn		Hook Switch Control (Default=0)

H0	Hangs up the telephone line
H1	Picks up the telephone line
In	Identification/checksum option (Default=0)
I0	Reports product code
I1	Reports modem chip firmware version
I2	Verifies ROM checksum
I3	Reports device set name
I4	Reserved
I5	Reserved for modem chip hardware configuration
I6	Country code
I7	Version of board manufacturer firmware
I8	Features of modem firmware
I10	Modem board configuration - bit set by board manufacturer
I11	Modem board configuration - bits set by board manufacturer
I14	SAFE device
I20	Cirrus Logic silicon version
I21	Cirrus Logic firmware version
I22	Cirrus Logic manufacturer name
I23	Cirrus Logic product model
Ln	Speaker Volume control (Default=2)
L0,1	Low volume.
L2	Medium speaker volume
L3	High speaker volume
Mn	Speaker On/Off (Default=1)
M0	Speaker off.
M1	Speaker on until modem detects the carrier signal.
M2	Speaker is always on when modem is off-hook.
M3	Speaker off during dialing, on until modem carrier present
Nn	Select data rate handshake (Default=1)
N0	Handshake only at DTE-to-modem data rate
N1	Begins handshake at DTE-to-modem data rate and falls to highest compatible rate
On	Go Online (Default=0)
O0	Returns modem to data mode
O1	Retrains equalizer and then returns to data mode
P	Pulse Dial
Qn	Result Codes (Default = 0)
Q0	Enables display of result codes
Q1	Disables display of result codes
Sn	Select an S-register
Sn=x	Write to an S-Register

Sn?	Read from an S-Register
T	Tone Dial
Vn	Result Codes Format (Default=1)
V0	Enable short-form result codes. (Numeric)
V1	Enable long-form result code. (Text or Verbose)
Wn	Response code data rate (Default=0)
W0	Reports DTE speed response codes
W1	Reports DTE speed response codes
W2	Reports DCE speed response codes
W3	Reports DTE speed response codes and information on error correction and data compression
Xn	Result Code type (Default=4)
X0	Enables result codes 0-4; disables detection of busy and dial tone
X1	Enables result codes 0-5, 10, and above; disables busy and dial tone detection
X2	Enables result codes 0-6 and 10 and above; disables busy detection and enables dial tone detection
X3	Enables result codes 0-5, 7, and 10 and above; enables busy detection and disables dial tone detection
X4	Enables result codes 0-7 and 10 and above; enables busy and dial tone detection
Yn	Long Space Disconnect (Default=0)
Y0	Disable Long Space Disconnect
Y1	Enable Long Space Disconnect
Zn	Recall stored profile (Default=0)
Z0	Resets modem and recalls user profile 0
Z1	Resets modem and recalls user profile 1
&Cn	DCD (data carrier detect) option (Default=1)
&C0	Ignores remote modem status; DCD always on
&C1	DCD set according to remote modem status
&Dn	DTR Control, Data Terminal Ready (Default=2)
&D0	In async mode, modem ignores DTR
&D1	Modem switches to command mode when DTR switches on
&D2	When DTR switches off, the modem goes on-hook and disables auto-answer mode; when DTR switches on, auto-answer is enabled
&D3	Turning off DTR re-initializes the modem and resets values except UART registers
&F	Load factory defaults
&Gn	Guard tone option (1200 bps and 2400 bps only) (Default=0)

&G0	disables guard tone
&G1	Enables 550-Hz guard tone
&G2	Enables 1800-Hz guard tone
&Jn	Auxiliary relay control (Default=0)
&J0	Auxiliary relay never operated
&J1	Activates auxiliary relay when modem is off-hook
&Kn	Select serial flow control (Default=3)
&K0	Disable flow control.
&K3	Bidirectional hardware flow control
&K4	Xon/Xoff software flow control
&M0	Communication mode option-modem supports only async mode (Default=0)
&Pn	dial pulse ratio (Default=0)
&P0	Sets 10-pps pules dial with 39% / 61% make-break
&P1	Sets 10-pps pules dial with 33 / 67 make-break
&Q0	Communication mode option-modem supports only async mode (Default=0)
&Sn	DSR (data set ready) option (Default=0)
&S0	DSR is always active
&S1	DSR active only during handshaking and when carrier is lost
&Tn	Self test commands (Default=0)
&T0	Terminate test in progress
&T1	Initiate Local Analog Loopback
&T3	Initiate Local Digital Loopback
&T4	Grants RDL request from remote modem
&T5	Denies RDL request from remote modem
&T6	Initiates remote digital loopback
&T7	Starts remote digital loopback with self-test
&T8	Initiate Local Analog Loopback with self test.
&Un	Disable Trellis coding (Default=0)
&U0	Enables Trellis coding with QAM as fallback
&U1	QAM modulation only
&Vn	View active and stored profiles (Default=0)
&V0	View stored profile 0
&V1	View stored profile 1
&V3	View relay and general-purpose input-output status
&Wn	Store active profile (Default=0)
&W0	Store in user profile 0
&W1	Store in user profile 1
&Yn	Select stored profile on power up (Default=0)
&Y0	Recall stored profile 0 on power-up

&Y1	Recall stored profile 1 on power-up
&Zn=x	Store Telephone Numbers n=0 to 3 and x=dial string.
%En	Auto-retrain control (V.22 bis and V.32 bis only) (Default=1)
%E0	Disables auto-retrain
%E1	Enables auto-retrain
%E2	enables line quality monitor and fallback/fall forward
%Gn	Rate renegotiation (Default=0)
%G0	Disabled
%G1	Enabled
-Cn	Generate data modem calling tone (Default=1)
-C0	Calling tone disabled
-C1	1300-Hz calling tone enabled
-C2	V.8 calling tone and 1300-Hz calling tone
+GMI?	Identify modem manufacturer
+GMM?	Identify product model
+GMR?	Identify product revision
+MS=m	Modulation selections (Default=V.34B, 1, 0, 0) (V.34 asymmetrical connections: 33,600 bps maximum)

DATA ERROR CORRECTION AND COMPRESSION COMMANDS

Your modem supports two types of error correction (MNP®2-4 and V.42) and data compression (MNP5 and V.42 bis). V.42 error correction uses LAPM as the primary error-control protocol and uses MNP2-4 as an alternative. V.42 bis data compression requires V.42 (LAPM only). MNP5 requires MNP2-4. The supported V.42 bis/MNP AT command is listed below:

Table 2. V.42/V.42 bis MNP AT Commands

Command	Description
%An	Set auto-reliable fallback character (Default=13)
%Cn	MNP 5 data compression control (Default=1)
%C0	No compression
%C1	Enables MNP5 data compression
\An	MNP Block Size (Default=3)
\A0	64 characters (This improves throughput on noisy phone line)
\Al	128 characters

\A2	192characters
\A3	256 characters
\Bn	Transmit Break
\Cn	Set auto-reliable buffer (Default=0)
\C0	No data buffering
\C1	Four-second buffer until 200 characters in the buffer or detection of a SYN character
\C2	No buffering. Connects non-V.42 modems to V.42 modem
\Gn	Set modem port flow control (Default=0)
\G0	Disable port flow control.
\G1	Set port flow control to XON/XOFF
\Jn	Bps rate adjust control (Default=0)
\J0	Disables rate adjust
\J1	Enables rate adjust
\Kn	Set break control (Default=5)
	In connect state, transmits break to remote (if in reliable mode):
\K0,2,4	Enters command mode, no break sent
\K1	Destructive/expedited
\K3	Nondestructive/expedited
\K5	Nondestructive/nonexpedited
	In command state, transmits break to remote (if in reliable mode):
\K0,1	Destructive/expedited
\K2,3	Nondestructive/expedited
\K4,5	Nondestructive/nonexpedited
	In connect state, receives break at modem port (if in direct mode):
\K0,2,4	Immediately sends break and enters command state
\K1,3,5	Immediately sends the break through
	In connect state, receives break at modem port and sends to serial port:
\K0,1	Destructive/expedited
\K2,3	Nondestructive/expedited
\K4,5	Nondestructive/nonexpedited
\Nn	Set operating mode (Default=3)
\N0	Selects normal mode with speed buffering
\N1	Selects normal mode with speed buffering
\N2	Select MNP reliable mode
\N3	Select V.42 auto-reliable mode
\N4	Select V.42 reliable mode
\O	Originate reliable link
\Qn	Set serial port flow control (Default=3)
\Q0	Disables flow control

	\Q1	XON/XOFF software flow control
	\Q2	Unidirectional hardware flow control
	\Q3	Bidirectional hardware flow control
\T0		Disables inactivity timer (Default=0)
\U		Accept reliable link
\Xn		Set XON/XOFF pass-through (Default=0)
	\X0	Processes flow control characters
	\X1	Processes flow control characters and passes to local or remote
\Y		Switch to reliable mode
\Z		Switch to normal mode
-Jn		Set V.42 detect phase (Default=1)
	-J0	Disables the V.42 detect phase
	-J1	Enables the V.42 detect phase
“Hn		V.42 bis compression control (Default=3)
	“H0	Disables V.42 bis
	“H1	Enables V.42 bis only when transmitting data
	“H2	Enables V.42 bis only when receiving data
	“H3	Enables V.42 bis for both transmitting and receiving data
“On		V.42 bis string length (Default=32)

FAX CLASS 1 AT COMMANDS

Your modem implements the EIA-578 dada/fax Class 1 AT command set standard. This AT command set allows a DTE (with Class 1 communication software) and a CL-MD34xx based modem to communicate with group 3 fax machines. The fax identity and test commands are listed below.

Table 3. Fax Identity Commands

Command	Function
+FMFR?	Identifies modem manufacturer
+FMDL?	Identifies product model
+FMI?	Identifies modem manufacturer
+FMM?	Identifies product model
+FMR?	Identifies product version number
+FREV?	Identifies product version number

Table 4. Fax Class 1 AT Commands

Command	Function	Range
+FCLASS=1	Mode selection (Default=0)	0, 1, 8, 80
+FAE=n	Fax/data autorecognition (Default=0)	0, 1
+FRH=n	Receive HDLC data	3
+FRM=n	Receive data	24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146
+FRS=n	Wait for silence	1-255
+FTH=n	Transmit HDLC data	3
+FTM=n	Transmit data	24, 48, 72, 73, 74, 96, 97, 98, 121, 122, 145, 146
+FTS=n	Stop transmission and pause	0-255

VOICE MODE AT COMMANDS

Your modemm implements a voice AT command set that allows a DTE to record and play back voice messages. This product is compatible with EIA/TIA IS-101 voice command set. Supported commands and descriptions are listed in following tables:

Table 5. Voice AT Commands

Command	Function	Default	Range
+FCLASS=8	Voice mode selection	0	0-2, 8, 80
+FLO=n	Flow Control Select n = 0 disables flow control n = 1 enables XON/XOFF n = 2 enables ITU-T V.24 CTS/RTS	1	0-2
+VTS=m	DTMF and Tone generation	none	Call
+VCID=n	Caller ID selection n = 0 disables Caller ID n = 1 Enables Caller ID formatted n = 2 Enables Caller ID unformatted	*0	0-2
+VCSD=n	Voice command mode silence detection n =0 disabled n = 1 enabled	0	0,1

+VDR=m	Distinctive Ring selection (can be disabled by +VEM command)	0,0	0-255, 0-255
+VIP=n	Initialize parameter	none	
+VLS=n	Relay/playback control	0	0-16
+VGT=n	Volume selection	128	121-131
+VTX	Play mode	none	Call
+VRA=n	Ringback-goes-away timer	50	0-50
+VRX	Record mode	none	Call
+VGR=n	Receive gain selection	128	121-131
+VRN=n	Ringback-never-appeared timer	10	0-255
+VSM=m	Compression method selection	140, 8000 0, 0:	Call
+VSD=m	Silence detection (quiet and silence)	128, 50	0-255,0-255
+VTD=n	Beep tone duration timer	100	5-255
+VEM=m	Event reporting and masking	'C' BB860980 BFE63883 BB863EE0	Call
+VBT=m	Buffer threshold setting	192,320	192,320
+VIT=n	DTE/DCE inactivity timer	0	0-255
+VNH=n	Automatic hang-up control	0	0-255
+VSP=n	Speakerphone on/off control	0	0,1
+VGM=n	Speakerphone microphone gain	128	121-131
+VGS=n	Speakerphone speaker gain	128	121-131

RADISH® VOICEVIEW

This modem implements the commands and protocols needed to support Radish VoiceView. Supported commands and responses are listed below:

Table 6. VoiceView Commands

Command	Function	Default
+FCLASS=80	Mode selection	0
+FLO=n	Flow control select	1
+FPR	Select DTE/DCE interface rate-turn on/off autobaud	4
-SVV	Start VoiceView data mode	

-SAC	Accept data mode request	
-SIP	Initialize VoiceView parameters	
-SCD	Capabilities data	
-SER?	Error status (ready only)	
-SIC	Reset capabilities to default setting	
-SDS	Disable switchhook status monitoring (required if DCE implements switchhook status monitoring and is used with handset adapter)	
-SSQ	Start capabilities query	
-SDA	Start modem data mode	
-SFX	Start fax data mode	
-SQR	Capabilities query response control	
-SSP	VoiceView transmission speed	
-SSR	Start sequence response control	
+VLS=n	Analog source/destination selection	
+VSP=n	Speakerphone on/off control	
+VGM=n	Speakerphone microphone gain	128
+VGS=n	Speakerphone speaker gain	128

Table 7. VoiceView Response Codes

Response	Function
-SFA	Fax data mode start sequence event (mandatory only if fax data mode is supported)
-SMD	Modem data mode start sequence event (mandatory only if modem data mode is supported)
-SSV	VoiceView data mode start sequence event
-SRA	Receive ADSI response event
-SRQ	Receive capabilities query event
-SRC:	Receive capabilities information event
-STO	Talk-off event

Table 8. VoiceView <DLE> Character Pairs

Command	Function
<CAN>	Abort data transfer in progress
<EOT>	End of message marker, final message of transaction, no response accepted (ASCII 10h 04h)
<ESC>	End of message marker, DCE shall immediately return to voice mode (ASCII 10h 1Bh)
<ETB>	End of message marker, final response requested, after

	which the transaction terminates (ASCII 10h 17h)
<ETX>	End of message marker, continue transaction, response requested (ASCII 10h 03h)

S-REGISTER

This modem provides direct access to the internal registers know as S-registers. The DTE uses S-registers to set up and check modem configurations. The content of these registers can be changed using the ATSn=x command, where "Sn" is the register name and "x"' is the value to be stored. The contents of the S-registers can be read using the ATSn? Command. Most S-registers can be read from or written to; however, some S-registers(such as S14) are read-only. Writing to a read-only register may cause the modem to act improperly. Reserved registers should never be written to. A list of supported S-registers follows:

Table 9. S-Register Summary

Register	Function	Range	Units	Type	Default
S0	Rings to auto-answer	0-255	Rings	R/W	0
S1	Ring counter	0-255	Rings	R/W	0
S2	Escape character	0-127	ASCII	R/W	43
S3	Carriage return character	0-127	ASCII	R/W	13
S4	Line feed character	0-127	ASCII	R/W	10
S5	Backspace character	0-32,127	ASCII	R/W	8
S6	Wait time before dialing	2-255	second	R/W	2
S7	Wait time for carrier	1-255	second	R/W	60
S8	Pause time for dial modifier	0-255	second	R/W	2
S9	Carrier recover time	1-255	0.1sec	R/W	6
S10	Lost carrier hang up delay	1-255	0.1sec	R/W	14
S11	DTMF dialing speed	50-255	ms	R/W	70
S12	Guard time	0-255	0.02s	R/W	50
S13	Reserved				none
S14	Bit Mapped options			R	170
S15	Reserved				none
S16	Modem test options			R	0
S17	Reserved				none
S18	Modem test tier	0-255	second	R/W	0
S19	Reserved				none
S20	Reserved				none

S21	Bit Mapped options			R	48
S22	Bit Mapped options			R	118
S23	Bit Mapped options			R	none
S24	Reserved				none
S25	Detect DTR change	0-255	0.01 s	R/W	5
S26	RTC to CTS delay interval				1
S27	Bit Mapped options			R	64
S30	Disconnect inactivity timer	0-255	minute	R/W	0
S31	Bit Mapped options			R	none
S33	XOFF character	0-255	ASCII	R/W	19
S37	Maximum Line Speed Attempt (Same as +MS=m<max rate> parameter.) 0 = DTE Rate 1 = Reserved 2 = Reserved 3 = 300 4 = Reserved 5 = 1200 6 = 2400 7 = 4800 8 = 7200 9 = 9600 10 = 12,200 11 = 14,400 12 = 16,800 13 = 19,200 14 = 21,600 15 = 26,400 16 = 26,400 17 = 28,800 18 = 31,200 19 = 33,600	0-19		R/W	0

OTHER COMMANDS AND RESPONSE CODES

Table 10. Dial Modifiers

Command	Function
0 to 9	Dialing digits
A, B, C, D, *, #	Tone dial characters
P	Pulse dial

R	Reverse originate mode
S=n	Dial NVRAM telephone number
T	Tone dial
W	Wait for dial tone
,	Pause
!	Flash hook
@	Wait for quiet answer
;	Return to command state
- ( )	Ignored by modem

Table 11. DTE-Modem Data Rate Response Codes

V0 Short Form	V1 Long Form	V0 Short Form	V1 Long Form
0	OK	25	CONNECT 12000
1	CONNECT	13	CONNECT 14400
2	RING	59	CONNECT 16800
3	NO CARRIER	14	CONNECT 19200
4	ERROR	61	CONNECT 21600
5	CONNECT 1200	62	CONNECT 24000
6	NO DIAL TONE	63	CONNECT 26400
7	BUSY	64	CONNECT 28800
8	NO ANSWER	28	CONNECT 38400
23	CONNECT 75/1200	18	CONNECT 57600
22	CONNECT 1200/75	31	CONNECT 115200
10	CONNECT 2400	33	FAX
11	CONNECT 4800	35	DATA
24	CONNECT 7200	45	RINGBACK
12	CONNECT 9600	+F4	+FCERROR